USDA Natural Resources Conservation Service

Ecological site F125XY004WV
Floodplain Alluvium

Last updated: 9/27/2024
Accessed: 11/09/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 125X–Cumberland Plateau and Mountains

This area is in Kentucky (43 percent), Tennessee (25 percent), West Virginia (20 percent), Virginia (9 percent), and Alabama (3 percent). It makes up about 20,330 square miles (52,685 square kilometers). The towns of Logan, Madison, Welch, and Williamson, West Virginia, and Norton and Wise, Virginia, are in the northeastern part of this area. The towns of Middlesboro, Williamsburg, Corbin, London, Hazard, and Pikeville, Kentucky, and La Follette and Crossville, Tennessee, are in the area. Chattanooga, Tennessee, and Huntsville, Alabama, are just outside the southeast and southwest corners, respectively.
Interstates 24, 64/77, 75, and 40/75 cross this area. The Cumberland Gap National Historic Park is in the part of this area along the Virginia and Kentucky border. The Daniel Boone and Jefferson National Forests occur in this area. Numerous State forests and parks are throughout the area (USDA-NRCS, 2006).

Ecological site concept

Soils typical of this site are on or near flood plains. Slopes range from 0 to 10 percent. These soils formed from limestone, sandstone and shale, or quartzite. Near the type location the mean annual temperature ranges from 53 to 59.4 degrees F., and mean annual precipitation ranges from 40 to 53.9 inches.

This site occurs entirely in the mesic temperature regime. Historic vegetation is unclear but most likely consisted of water-tolerant tree species and patches of canebrake. Much of this site has been cleared for agriculture or developed.

Associated sites

F125XY001WV	**Sandstone Residuum**
F125XY002WV	**Interbedded Sedimentary Colluvium**
F125XY003WV	**Interbedded Sedimentary Uplands**
F125XY005WV	**Low Stream Terrace Alluvium**

Table 1. Dominant plant species

Tree	(1) *Liriodendron tulipifera* (2) *Fagus grandifolia*
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

The block diagram below depicts the general location of the Atkins, Pope, and Tate soils on flood plains and stream terraces in association 1 (Soil Survey of McCreary-Whitley Area, Kentucky; 1970).

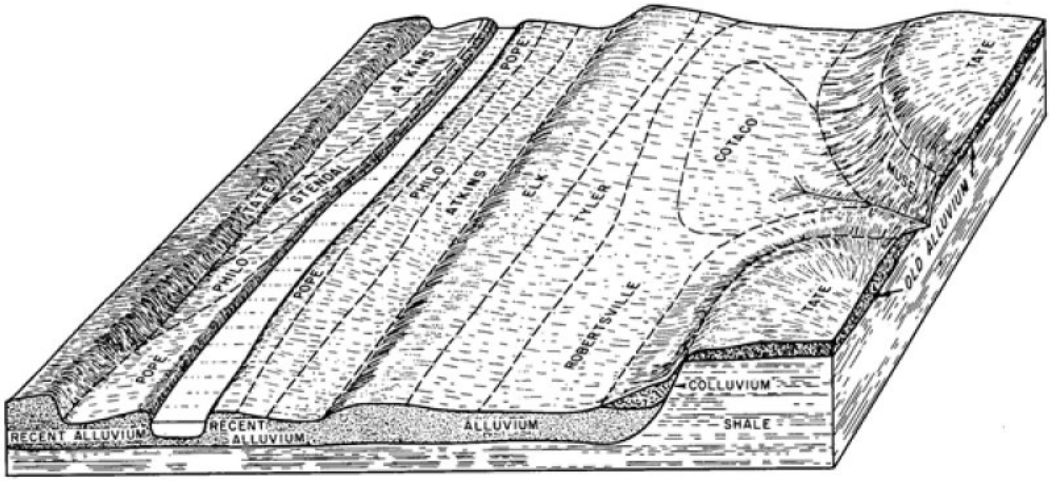

Figure 1. Block Diagram

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding duration	Long (7 to 30 days)
Flooding frequency	None to frequent
Elevation	200–3,323 ft
Slope	0–10%
Water table depth	0–76 in
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation is mostly 37 to 45 inches
(940 to 1,145 millimeters) in the northern third of this area and 45 to 60 inches (1,145 to 1,525 millimeters) in the southern two-thirds. It is almost 60 inches (1,525 millimeters) at the higher elevations in the northern third of the area and is as much as 75 inches (1,905 millimeters) in the mountains in the southern two-thirds. Almost half of the annual precipitation falls during the growing season. Rainfall typically occurs during high-intensity, convective thunderstorms in summer. Snow may occur during winter in the northern part of the area
and at the higher elevations. The average annual temperature is 50 to 60 degrees F (10 to 15 degrees C). The freeze-free period averages 200 days and ranges from 170 to 225 days. The shorter freeze-free periods are at the higher elevations and in the more northerly parts of the area (USDA-NRCS, 2006).

Table 3. Representative climatic features

Frost-free period (average)	162 days
Freeze-free period (average)	189 days
Precipitation total (average)	51 in

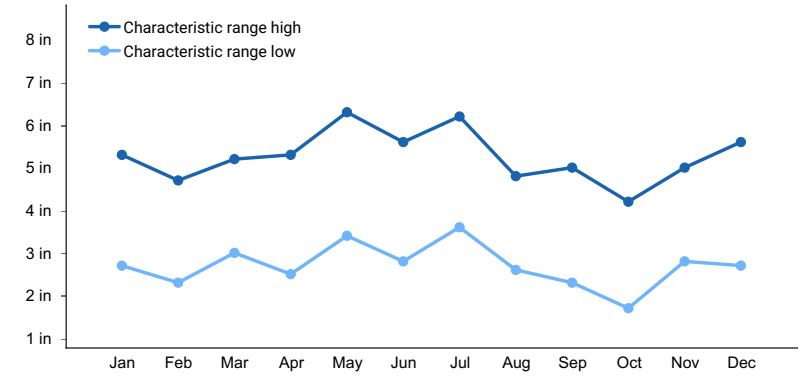

Figure 2. Monthly precipitation range

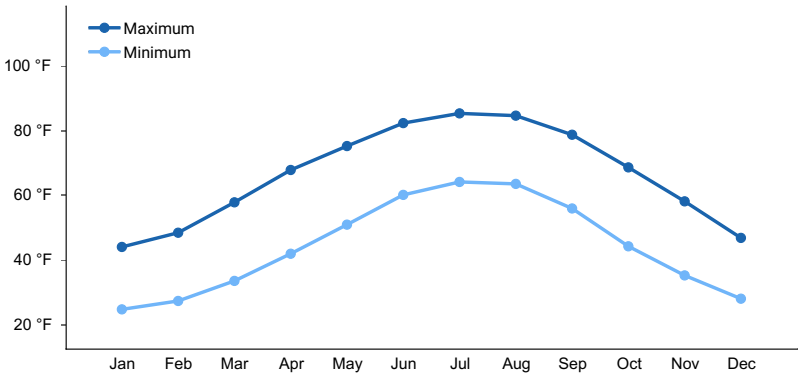

Figure 3. Monthly average minimum and maximum temperature

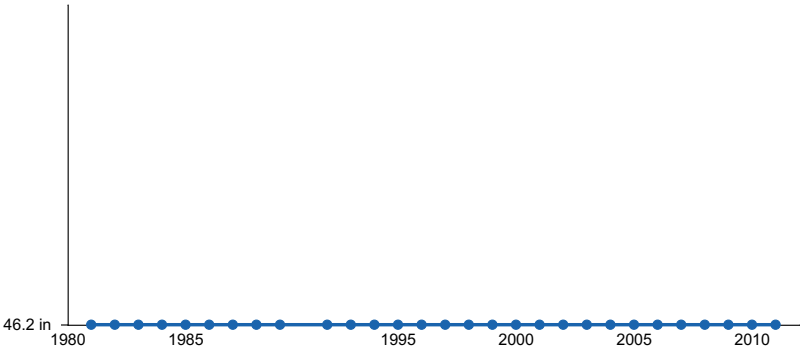

Figure 4. Annual precipitation pattern

Climate stations used

- (1) SODDY DAISY-MOWBRAY [USC00408445], Soddy Daisy, TN
- (2) GRUNDY [USC00443640], Grundy, VA
- (3) BARBOURVILLE [USC00150381], Corbin, KY
- (4) LONDON LOCKS [USC00465365], Cedar Grove, WV

Influencing water features

Most soils associated with this site experience occasional flooding. However, streams cannot be classified at this scale.

Soil features

Soil series in this PES include Atkins, Barbourville, Bonair, Bonnie, Chagrin, Chavies, Craigsville, Cuba, Ealy, Elk, Elkins, Grigsby, Holly, Huntington, Lily, Lobdell, Melvin, Middlebury, Nelse, Newark, Nolin, Ogles, Orrville, Philo, Pope, Potomac, Rowdy, Sensabaugh, Sewanee, Shelocta, Skidmore, Steff, Stendal, Stokly, and Yeager.

Table 4. Representative soil features

Parent material	(1) Alluvium–limestone (2) Colluvium–sandstone and shale (3) Residuum–quartzite
Surface texture	(1) Channery fine sandy loam (2) Cobbly loamy sand (3) Extremely channery loam
Family particle size	(1) Loamy
Drainage class	Very poorly drained to somewhat excessively drained
Permeability class	Slow to rapid
Soil depth	30–80 in
Surface fragment cover <=3"	0–8%
Surface fragment cover >3"	0–8%
Available water capacity (0-40in)	1.8–9.1 in
Soil reaction (1:1 water) (0-40in)	4.6–6.7
Subsurface fragment volume <=3" (Depth not specified)	0–40%
Subsurface fragment volume >3" (Depth not specified)	0–75%

Ecological dynamics

A large extent of this PES is cultivated to corn, sorghum, small grains, tobacco, hay, pasture and vegetables. Native vegetation is mixed, deciduous hardwood forests of mainly tulip poplar, white oak, river birch, sycamore, beech and hickory. Native canebrakes most likely occurred in large patches. On soils with poor drainage, vegetation is a mixed hardwood forest of water tolerant oaks, red maples, black gum, sweet gum, willow, elm, ash, and alder; with aquatic grasses and sedges in places. Many areas have been filled in, and in subsequent decades developed for urban uses. A good deal of the acreage currently used for agriculture has been drained in the past.

State and transition model

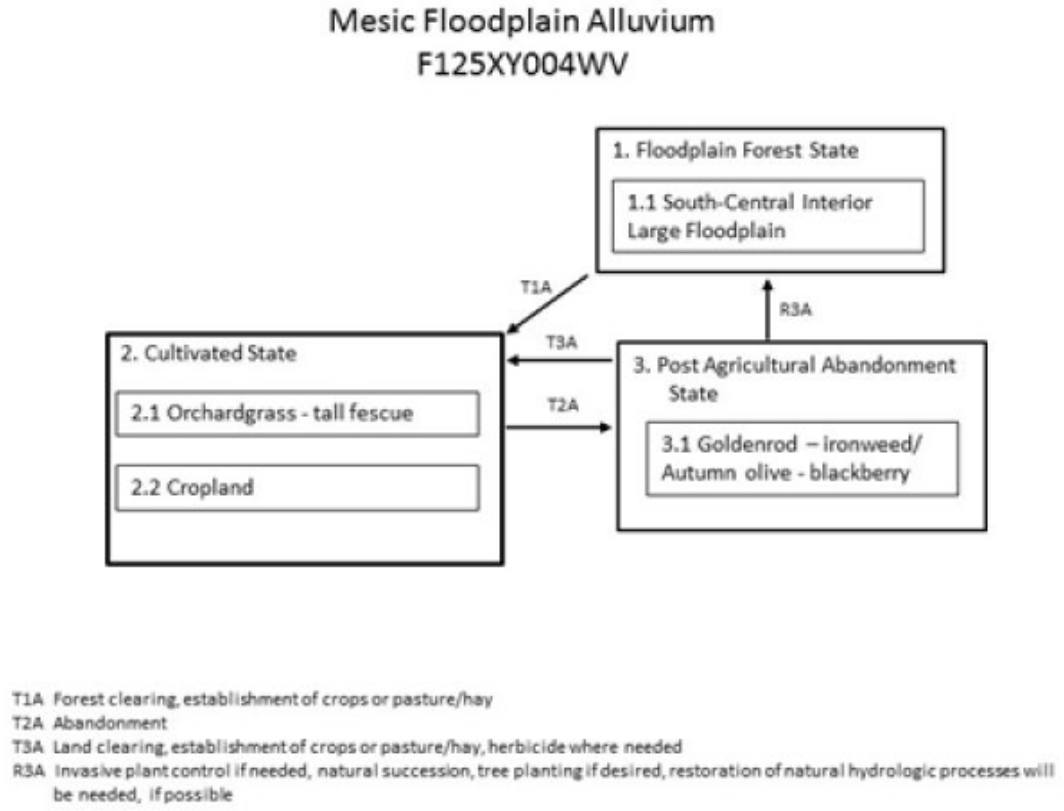

Figure 6. State and Transition Model

State 1
Floodplain Forest State

This is an approximation of the reference state based on the best available information. It has not been validated in the field.

Community 1.1
South-Central Interior Large Floodplain

Taken from the NatureServe description: "This floodplain system is found in the Interior Highlands as far west as eastern Oklahoma, as well as throughout the Interior Low Plateau, Cumberlands, Southern Ridge and Valley, and Western Allegheny Plateau, and lower elevations of the Southern Blue Ridge. Examples occur along large rivers or streams where topography and alluvial processes have resulted in a well-developed floodplain. A single occurrence may extend from river's edge across the outermost extent of the floodplain or to where it meets a wet meadow or upland system. Many examples of this system will contain well-drained levees, terraces and stabilized bars, and some will include herbaceous sloughs and shrub wetlands resulting, in part, from beaver activity. A variety of soil types may be found within the floodplain from very well-drained sandy substrates to very dense clays. It is this variety of substrates in combination with different flooding regimes that creates the mix of vegetation. Most areas, except for the montane alluvial forests, are inundated at some point each spring; microtopography determines how long the various habitats are inundated. Although vegetation is quite variable in this broadly defined system, examples may include *Acer saccharinum*, *Platanus occidentalis*, *Liquidambar styraciflua*, *Populus deltoides*, and Quercus spp. Understory species are mixed, but include shrubs, such as *Cephalanthus occidentalis* and *Arundinaria gigantea* ssp. gigantea, and sedges (Carex spp.). This system likely floods at least once annually and can be altered by occasional severe floods. Impoundments and conversion to agriculture can also impact this system." (Accessed 5/5/17) Copyright Notice: Copyright © 2017 NatureServe, 4600 N. Fairfax Dr., 7th Floor,

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State 2
Cultivated State

Community 2.1
Orchardgrass - tall fescue

These areas are used for hay and pasture. Beef cattle farms are common.

Community 2.2
Cropland

Commonly grown crops include corn, sorghum, soybeans, vegetables and, in some areas, nursery crops. Much of this phase has been drained in the past.

State 3
Post Agricultural Abandonment State

The type and extent of effort needed to push this state back to the reference condition varies widely and is dependent on local factors. It could be as simple as allowing natural succession to happen or could require intensive intervention from removing drainage structures to controlling invasive plant species.

Community 3.1
Goldenrod – ironweed/ Autumn olive - blackberry

Vegetation responses after agricultural abandonment vary widely on this site and are dependent on a number of localized factors. Whether or not the site has been drained, surrounding land use, type and intensity of past disturbance and proximity to invasive exotic species could all be important drivers. However, goldenrod, ironweed, autumn olive and blackberry are commonly noted.

Transition A
State 1 to 2

Forest clearing, establishment of crops or pasture/hay

Transition A
State 2 to 3

Abandonment

Restoration pathway A
State 3 to 1

Invasive plant control if needed, natural succession, tree planting if desired, restoration of natural hydrologic processes, if possible

Transition A
State 3 to 2

Land clearing, establishment of crops or pasture/hay, herbicide where needed

Additional community tables

Other references

National Park Service. Geology and History of the Cumberland Plateau [web application]. Available

https://www.nps.gov/biso/planyourvisit/upload/webgeo.pdf (Accessed: April 11, 2017).

NatureServe. 2017. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://explorer.natureserve.org. (Accessed: April 11, 2017).

Smalley, Glendon W. 1982. Classification and evaluation of forest sites on the Mid-Cumberland Plateau. USDA-USFS., Gen. Tech. Rep. SO-38. Southern Forestry Experiment Station., New Orleans, LA. 58 p.

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Contributors

Belinda E. Ferro

Approval

Greg Schmidt, 9/27/2024

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	11/09/2024
Approved by	Greg Schmidt
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if**

their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:

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17. **Perennial plant reproductive capability:**
